CNO abundance in the early Galaxy

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Carbon enhanced metal poor (CEMP) stars contribute to about 20% of the metal poor stars below [Fe/H] < -2.0. The origin of carbon in these stars could be due to AGB mass transfer in a binary system. These class of objects (CEMP-s) also show enhancement of s-process elements, and most of them show radial velocity variatons indicating the presence of companion. However, the class CEMP stars that do not show s-process enhancement, that are more dominant at much lower metallicities ([Fe/H] < -3.5), are thought to be true first low mass stars that recieved contribution from winds of rotating very massive star (spinars) or faint supernovae. C,N,O abundances of these objects are crucial to understand the contributions of C,N,O from these massive stars. However, obtaining oxygen abudances is very time consuming and difficult in CEMP stars due to the weak 6300 [OI] line and crowded C_2 and CN lines in cool-CEMP stars that requires high resolution, high S/N optical spectra.
Hence, we use CO rovibrational bands in the NIR region, to derive oxygen abudances. For a carbon enhanced star the CO lines are sensitive to change in oxygen abudnaces. We also derived C,N,O abudances from optical wavelengths to calibrate the C,N,O abudnaces from NIR CO lines for a subset of CEMP stars. Here, we report CNO measurements of 10 CEMP stars from high resolution optical spectra and low resoluton NIR spectra and compare them. This is the first time such comparison of CNO abundance over optial and NIR wavalength done in CEMP stars. We also present detailed abundance of alpha, Fe-peak, and n-capture elements as well to understand the origin of CNO.